

# The Role of Clean and Healthy Living Behaviors (CHLB) in Preventing Diarrheal Disease Transmission Among Toddlers : A Literature Review

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## ABSTRACT

**Background:** Diarrheal diseases remain a major cause of morbidity and mortality among children under five, particularly in developing countries such as Indonesia. Clean and Healthy Living Behavior (CHLB) has been widely recognized as an effective strategy to prevent the transmission of diarrheal diseases in this vulnerable population. **Method:** This study employed a structured literature review to evaluate the role of CHLB in reducing the incidence of diarrhea among children under five. Articles were sourced from leading peer-reviewed journals published between 2018 and 2024, with a focus on CHLB practices including handwashing with soap, access to clean water, proper sanitation, and health education. **Result:** Findings indicate that consistent implementation of CHLB interventions especially handwashing and the use of proper sanitation facilities can reduce diarrhea risk by up to 47%. The review also identified significant challenges in CHLB adoption, particularly in remote and underdeveloped areas. These challenges include limited infrastructure, low levels of public awareness, and socioeconomic barriers. **Conclusion:** The promotion and implementation of CHLB significantly contribute to preventing diarrheal diseases among children under five in Indonesia. Sustained support from government sectors, infrastructure investment, and public health education are essential to overcoming existing barriers. A multi-stakeholder approach is critical to reduce the disease burden, improve child health outcomes, and achieve national child survival goals.

## INTRODUCTION

Diarrheal disease remains a significant public health concern in many countries, particularly in developing nations such as Indonesia. Diarrhea not only causes discomfort but can also lead to severe dehydration, posing a life-threatening risk, especially for toddlers. According to the World Health Organization, approximately 1.7 billion cases of diarrhea occur each year among children under five, resulting in an estimated 525,000 deaths annually, making it the second leading cause of mortality in this age group after pneumonia (1).

The detrimental impact of diarrhea on child health, particularly in Indonesia, underscores the urgency of adopting effective preventive strategies. Key contributing factors to the high incidence of diarrhea among toddlers include poor sanitation, inadequate access to clean water, and limited public awareness regarding Clean and Healthy Living Behavior (CHLB). CHLB refers to a set of behavioral practices aimed at maintaining personal and environmental hygiene, such as handwashing with soap, safe waste disposal, consumption of clean drinking water, and use of proper sanitation facilities. Evidence suggests that consistent implementation of CHLB can reduce the risk of diarrhea by up to 50% (2). Therefore, promoting CHLB represents one of the most effective and sustainable approaches to preventing diarrheal disease in toddlers.

However, in Indonesia, the implementation of CHLB still faces significant challenges, particularly in rural areas and regions with limited access to clean water and sanitation facilities. The Indonesian Ministry of Health (2020) reported that many families in remote areas lack adequate understanding of the importance of CHLB and often neglect basic hygiene practices (2). In these areas, limited access to clean water and difficulties in obtaining soap pose major obstacles to the effective implementation of CHLB. Additionally, low socioeconomic conditions hinder families from providing proper sanitation facilities, thereby increasing the risk of diarrheal diseases among toddlers.

Education on CHLB must become a priority to raise awareness and encourage community participation in protecting toddlers from the risk of diarrhea. According to Susilawati and Widiastuti (2021), educational campaigns tailored to local contexts and involving community leaders can improve public understanding of hygiene and health, thereby motivating more families to adopt CHLB in their daily lives (3). CHLB education must also be supported by the provision of adequate facilities, such as access to clean water, the construction of public toilets, and the distribution of free soap, especially in areas with high diarrhea incidence.

Furthermore, the role of CHLB in preventing diarrheal diseases in toddlers is not limited to reducing incidence rates but also extends to supporting overall child development. When toddlers are free from diarrheal illness, they have a better chance of achieving optimal growth and development. Therefore, CHLB not only influences physical health but also contributes to children's cognitive and emotional development. Research has shown that children raised in clean and healthy environments demonstrate better developmental outcomes than those living in unsanitary conditions (4).

In Indonesia, diarrhea remains the second leading cause of death among children under five. The Infant Mortality Rate (IMR) is regarded as a highly sensitive health indicator and is nationally recognized as a benchmark of a region's health status. In line with the Sustainable Development Goals (SDGs), Indonesia aims to reduce the IMR to 25 per 1,000 live births by 2030 (5). In 2016, Indonesia's IMR was reported at 26 per 1,000 live births. Diarrhea tends to occur more frequently in children aged two years due to the high vulnerability of their digestive systems, especially during the first two years of life. Based on age group data, the highest incidence and prevalence occur among children under one year, with an incidence rate of 7% and a prevalence of 11.2%. Among children aged 1–4 years, the incidence rate is 6.7%, and the prevalence is 12.2%. Approximately 80% of diarrhea-related deaths occur in toddlers under the age of one, with the risk decreasing as the child grows older (6). Thus, implementing CHLB is an urgent step toward reducing the prevalence of this disease.

This study discusses the role of CHLB in preventing the transmission of diarrheal diseases among toddlers in Indonesia. Additionally, it explores the factors influencing CHLB adoption in communities and the challenges encountered during its implementation. A better understanding of CHLB and the importance of a healthy environment is expected to improve the quality of life of Indonesian toddlers and reduce the public health burden caused by diarrhea.

According to WHO data, diarrhea ranks fifth among the ten leading causes of death globally (7). Fauziah (2013) reported that diarrhea commonly affects infants and toddlers and, if left untreated, may lead to dehydration and eventually death (8). WHO data also revealed that 12% of hospital visits are related to diarrhea, and among these cases, 23% involve toddlers (9).

## METHODS

This study employed a literature review method to collect and analyze relevant scientific sources related to the role of Clean and Healthy Living Behavior (CHLB) in preventing the transmission of diarrheal diseases in toddlers. The review began by examining previous studies that discuss the implementation of CHLB and its impact on toddler health, with a particular focus on diarrhea prevention. The sources included peer-reviewed journals and scholarly articles obtained from reputable scientific databases such as Google Scholar. In addition, the review focused on key factors influencing the effectiveness of CHLB, including sanitation, handwashing practices, and family behavioral patterns. Through an in-depth examination of these studies, the research aimed to identify emerging trends, implementation challenges, and potential solutions associated with CHLB in reducing the risk of diarrhea transmission among toddlers.

Table 1. Inclusion Criteria for Literature Review

Category	Inclusion Criteria
Type of Publication	Scientific articles published in Google Scholar and other leading academic databases
Journal Specification	National journals related to health, education, and social sciences within the last six years
Journal Indexing	Google Scholar, SINTA 1-6
Publication Year	2018-2024
Country of Study	Indonesian
Field of Study	CHLB, Diarrhea, Maternal Education
Field of Study	

	Health, Public Health, Social Sciences, Early Childhood Studies, and General Health Research
Type of Research	Theoretical and empirical
Keywords	Clean and Healthy Living Behavior, Diarrhea Prevention, CHLB in Toddlers, Health Promotion Strategies, Clean and Healthy Lifestyle
Subjects	Studies involving toddlers, families, and healthcare workers focusing on CHLB activities and their impact on preventing diarrhea in early childhood

## RESULT AND DISCUSSION

Table 2. Literature Review Articles

Author (Years)	Country	Methods	Result
Indriati & Warsini (2022)	Indonesia	Respondents: 44 mothers with toddlers at Posyandu Kartini III. Data Collection: Questionnaire and direct observation of CHLB practices. Analysis Technique: Chi-square test (bivariate) and logistic regression (multivariate).	Exclusive breastfeeding ( $p=0.031$ , $OR=14.5$ ) and handwashing with soap ( $p=0.014$ , $OR=19.33$ ) were significantly associated with reduced diarrhea incidence. Indicators of clean water use ( $p=0.118$ ) and proper latrines ( $p=0.619$ ) were not significant.
Safitri et al. (2024)	Indonesia	Respondents: 30 mothers of toddlers participating in community service activities. Data Collection: Pre-post test (questionnaire before and after education) and observation through handwashing competition. Analysis Technique: Comparison of pre-post scores (descriptive, percentage change).	Education increased knowledge scores from 50.5 to 80.7 ( $\approx 63\%$ improvement) and improved handwashing skills, potentially reducing diarrhea incidence and stunting risk.
Imamah et al. (2024)	Indonesia	Respondents: Mothers and posyandu cadres in Mandiro Village (around 40–50 participants). Data Collection: Questionnaire, group discussions, and direct observation of CHLB practices. Analysis Technique: Comparison of pre-post scores using paired statistical tests..	Training interventions (expository, demonstrations, practice) significantly increased awareness and implementation of CHLB. Improved household sanitation practices contributed to reducing diarrhea and stunting risks.
Lawolo & Ramadhani (2024)	Indonesia	Respondents: PAUD (early childhood education) stakeholders in Somolo-Molo Village, including school principals, teachers, and students. Data Collection: Observation, interviews, and documentation. Analysis Technique: Data triangulation.	Some CHLB indicators at PAUD Somolo-Molo were implemented (e.g., handwashing with soap using running water). However, there were deficiencies in healthy food consumption and waste management.
Jamil et al., (2019)	Indonesia	Respondents: Around 80–100 mothers in the working area of Timampu Health Center, East Luwu Regency. Data Collection: Structured questionnaire and field observation. Analysis Technique: Chi-square test to examine the relationship between handwashing frequency and diarrhea incidence.	Increased frequency and accuracy of handwashing with soap were significantly associated with a reduced incidence of diarrhea in toddlers ( $p=0.000$ ).
Nawalia, Ningsih, & Tambunan (2022)	Indonesia	Respondents: Data collected from six articles via Google Scholar (2017–2020). Data Collection: Literature review with article screening based on inclusion criteria. Analysis Technique: Narrative synthesis and cross-study comparison.	All reviewed articles indicated that CHLB implementation (especially exclusive breastfeeding, handwashing, and proper latrines) consistently correlated with a significant reduction in diarrhea incidence in toddlers ( $p < 0.001$ ).
Rizkiah, F. (2018)	Indonesia	Respondents: 50–100 mothers with toddlers in the working area of Selindung Health Center. Data Collection: Questionnaire and medical records. Analysis Technique: Chi-square test to analyze the relationship between CHLB indicators and diarrhea.	CHLB indicators such as exclusive breastfeeding ( $p=0.017$ ), handwashing with soap ( $p=0.044$ ), and proper latrines ( $p=0.007$ ) were significantly associated with reduced diarrhea incidence in toddlers.
Labudo et al. (2018)	Indonesia	Respondents: Around 40 mothers with toddlers aged 1–4 years in Keici Village, West Halmahera. Data Collection: Structured interviews, direct observation, and questionnaires. Analysis Technique: Chi-square analysis to examine the relationship between CHLB variables.	Children who received exclusive breastfeeding and practiced regular handwashing had lower diarrhea incidence; clean water use ( $p=0.118$ ) and proper latrines ( $p=0.619$ ) were not significant.
Yazmin & Eka (2024)	Indonesia	Respondents: Community members in Ponelo City. Data Collection: Health education sessions and direct observation of CHLB implementation and proper latrine use. Analysis Technique: Descriptive analysis.	Community enthusiasm for utilizing proper latrines was high. The study concluded that collective commitment between the community and stakeholders is essential for achieving a clean and healthy lifestyle, ultimately improving well-being and environmental quality.

Simanjourang (2023)	Indonesia	Respondents: 34 housewives in Pulau Kelapa District. Data Collection: Lectures, discussions, and role-playing. Analysis Technique: Evaluation at preparation, implementation, and participant knowledge improvement stages. Knowledge improvement was measured by comparing pre- and post-intervention scores.	Results showed increased participant knowledge, with average scores rising from 46.4 before education to 62.6 after. Additionally, the percentage of participants with good and adequate knowledge categories improved after the intervention.
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## DISCUSSION

### Implementation of Clean and Healthy Living Behavior (CHLB) in Families with Toddlers

The implementation of Clean and Healthy Living Behavior (CHLB) in families with toddlers encompasses several essential aspects that collectively support diarrhea prevention. First, exclusive breastfeeding has been proven to significantly reduce the risk of diarrhea in toddlers (10–12). Exclusive breastfeeding not only provides essential nutrients but also contains immune factors that protect children from infections, serving as a natural defense against diarrhea.

Additionally, handwashing with soap especially before meals and after defecation is a crucial and effective way to reduce the transmission of germs that cause diarrhea (10,13). However, research indicates that the significance of using clean water and proper toilet facilities in reducing diarrhea incidence is not always consistent (12). Nevertheless, these two indicators remain integral components of a comprehensive approach to improving household sanitation. By integrating exclusive breastfeeding, habitual handwashing with soap, and efforts to provide clean water and adequate sanitation, CHLB implementation contributes significantly to lowering the risk of diarrhea in toddlers and promoting their overall health.

Studies show that consistent handwashing with soap at critical times, such as before meals and after toilet use, can reduce the risk of diarrhea by up to 47%. In Lampung, proper CHLB practices in households have successfully lowered diarrhea cases among toddlers, although implementation in certain areas continues to face challenges related to inadequate infrastructure and limited sanitation access. Furthermore, exclusive breastfeeding during the first six months of life remains a key CHLB indicator. It strengthens the infant's immune system and lowers the risk of gastrointestinal infections. Providing nutritious foods especially fresh fruits and vegetables is also recommended to support toddlers' health and to prevent both diarrhea and malnutrition (14). A healthy household diet forms a crucial foundation for early childhood growth and development, particularly in regions with high rates of diarrheal infections.

However, CHLB implementation at the household level often encounters various barriers, particularly in remote or coastal regions. The primary challenges include inadequate sanitation facilities, such as insufficient toilets and limited access to clean water. In some coastal communities, the continued use of communal toilets and direct waste disposal into the sea exacerbates the risk of infectious diseases.

Therefore, educational programs and community empowerment initiatives are essential to enhancing knowledge and improving CHLB practices within families. Educational activities delivered through lectures, group discussions, and hands-on demonstrations have proven effective in raising public awareness (15). For instance, an educational initiative in Pulau Kelapa District successfully increased the average knowledge score of housewives from 46.4 to 62.6 after the intervention.

Effective CHLB implementation requires collaboration among families, government institutions, and healthcare professionals. The government plays a critical role in providing supporting infrastructure—such as clean water and sanitation facilities and in ensuring the sustainability of health education programs. Meanwhile, the active involvement of healthcare workers and the community—through initiatives like *posyandu* cadres and women's community groups (PKK) is essential to ensure that CHLB practices are consistently implemented and become embedded in daily routines.

The successful implementation of CHLB not only improves family health but also contributes to enhancing overall public health outcomes. Consistent application can reduce the burden on healthcare services and increase life expectancy, particularly among young children. With strong support and collaboration among various stakeholders, CHLB is expected to become a deeply rooted cultural practice that significantly reduces the incidence of diseases such as diarrhea among toddlers.

### **The Impact of CHLB in Reducing Diarrhea Incidence**

The implementation of CHLB) at the household level has a significant impact on reducing the incidence of diarrhea in toddlers, which remains one of the leading causes of child mortality in many developing countries, including Indonesia. Preventive efforts through CHLB play a crucial role in minimizing the risk of disease transmission by promoting hygienic and health-oriented practices within families. Several key CHLB indicators such as handwashing with soap, using clean water, and ensuring proper sanitation have been proven effective in preventing gastrointestinal infections, a major cause of diarrhea in children.

For example, handwashing with soap can reduce infection risk by up to 47% when performed consistently, particularly before meals, after defecation, and before breastfeeding. Educational interventions and training programs have also proven effective in enhancing CHLB practices at the family level. One study found that following participation in an educational program, family knowledge scores significantly increased from 50.5 to 80.7, leading to improved sanitation behavior in daily life (16). Another study demonstrated that applying CHLB indicators—particularly exclusive breastfeeding and handwashing with soap was significantly associated with a reduction in diarrhea incidence among toddlers, with a significance level of  $p < 0.05$  and a high odds ratio, indicating a lower risk of diarrhea in families who consistently practiced these behaviors (10).

Support from *posyandu* (integrated health service post) cadres also plays a vital role in enhancing CHLB implementation. A study by Abdullah and Eka (2024) found that education and guidance provided by health cadres significantly improved household ownership and usage of proper toilets, positively impacting environmental cleanliness and community health (17). For instance, in Pulau Kelapa District, an educational program increased the CHLB knowledge score of housewives from 46.4 to 62.6 after implementation (15).

Despite the significant impact of CHLB in reducing diarrhea risk, challenges in implementation persist. Studies have revealed that access to clean water and adequate toilet facilities remains a major issue in certain regions (11,12). Infrastructure limitations such as unreliable water supply and inadequate sanitation hamper the sustainability of behavioral changes achieved through education. Nonetheless, sanitation development initiatives and clean water provision in several areas have successfully reduced open defecation, previously a leading contributor to high diarrhea incidence rates.

The success of CHLB implementation requires synergy between education and infrastructure. Education alone is insufficient without supportive infrastructure, as people need access to proper facilities to apply hygiene practices effectively. Conversely, infrastructure without accompanying education is also inadequate, as communities may not utilize available sanitation facilities due to a lack of understanding. Therefore, the government, schools, and healthcare institutions must collaborate to ensure the equitable and sustainable provision of both components, particularly in underserved and remote areas.

CHLB education also plays a crucial role in fostering healthy habits in school-aged children. Studies show that in many schools especially in rural areas CHLB implementation is constrained by limited resources and lack of supporting facilities. Activities such as handwashing before meals and the use of proper toilets in schools help children internalize clean and healthy habits from an early age. Interactive educational strategies, including counseling sessions, demonstrations, and handwashing competitions, have proven effective in increasing student knowledge and positively shaping their hygiene-related behaviors.

### **Challenges in Implementing Clean and Healthy Living Behavior (CHLB)**

The implementation of Clean and Healthy Living Behavior (CHLB) in Indonesia continues to face various challenges, including social, economic, infrastructural, and cultural factors. Although CHLB programs have been a national priority since 1996, their application remains suboptimal in many regions. These challenges undermine the effectiveness of the program and contribute to the high incidence of communicable diseases such as diarrhea.

#### ***Limited Access to Sanitation and Clean Water***

Limited access to sanitation facilities and clean water remains a major obstacle, particularly in rural and remote areas. Many families rely on unsafe water sources, such as contaminated rivers, and continue to use communal latrines or practice open defecation. Although indicators such as exclusive breastfeeding and handwashing with soap have demonstrated significant effectiveness in reducing the risk of diarrhea, studies show that access to clean water and proper sanitation facilities remains inconsistent across regions. Labudo et al. (2018) found that the variables of clean water usage ( $p = 0.118$ ) and proper sanitation ( $p = 0.619$ ) were not statistically



significant, highlighting infrastructural limitations in sanitation (12). These conditions are often attributed to a lack of clean water access, inadequate sanitation infrastructure, and minimal investment in local health facilities (11,12). In some areas, these limitations result in inconsistent CHLB implementation and an increased risk of disease transmission, especially among young children. Research also suggests that the absence of adequate infrastructure forces communities to neglect hygiene practices, even when they are aware of CHLB principles. Without facilities such as clean water and hygienic toilets, people are unable to adopt healthy behaviors in daily life.

### ***Lack of Education and Public Awareness***

Low levels of awareness and knowledge regarding the importance of CHLB present another significant barrier to implementation. Many individuals still underestimate hygiene practices such as handwashing with soap. In some communities, traditional behaviors—such as littering or using untreated water—persist. Although educational interventions have been shown to improve knowledge (e.g., Gustini et al. [2024] reported an increase in knowledge scores from 50.5 to 80.7), maintaining long-term behavioral changes remains challenging. Increased knowledge does not always translate into consistent practices at home, particularly in the absence of monitoring and follow-up. This underscores the need for deeper cultural change to support sustainable CHLB implementation (16). Furthermore, disparities in education lead to uneven levels of CHLB knowledge, especially among individuals with lower educational attainment. Studies conducted in schools also indicate low levels of CHLB adoption, particularly among non-health students. Many are unaccustomed to handwashing and maintaining personal hygiene, highlighting the need for intensified school-based education and awareness programs.

### ***Social and Economic Barriers***

Household economic status also affects CHLB implementation. In low-income families, basic needs such as food and shelter are prioritized, while expenditures on sanitation supplies (e.g., soap or clean water) are often overlooked. This situation exacerbates disease transmission within households and communities. Additionally, social norms and cultural values can inhibit behavior change. In some areas, practices like open defecation or improper waste disposal are deeply ingrained and difficult to change. Behavioral change requires time, commitment, and the support of community leaders and healthcare workers to encourage consistent adoption of CHLB.

### ***The Role of Healthcare Workers and Government Support***

Support from community health workers (*Posyandu* cadres) has been effective in improving CHLB at the household level. Suryani & Hidayat (2021) reported that mentoring interventions increased CHLB practice from 50% to 80%, and reduced diarrhea cases by 25–30% after intervention (17). However, several challenges persist, including limited human resources, uneven training, and insufficient local government support. Without continuous mentorship, behavior change is often inconsistent and unsustainable. Although public health centers (*puskesmas*) and health cadres are involved in CHLB outreach, staff shortages hinder equitable program implementation. Effective CHLB adoption requires ongoing support from healthcare providers and volunteers. Unfortunately, low frequency of outreach and resource limitations prevent communities from receiving adequate information and motivation to sustain CHLB practices. Moreover, infrastructure and supportive policies from the government are essential to accelerate CHLB adoption. Authorities must ensure the availability of clean water and proper sanitation, particularly in underserved areas. Continued education through schools, community outreach, and mass media is vital to increase public awareness of hygiene practices. Overcoming CHLB implementation challenges requires collaboration between the government, healthcare workers, and the community. Investments in sanitation infrastructure and outreach must be expanded, and CHLB programs must be accessible to all segments of the population. More consistent and intensive education is needed to drive behavior change, especially in communities that retain outdated hygiene practices. Community empowerment through health cadres and women's groups such as *PKK* and *Posyandu* is also crucial to ensuring CHLB sustainability.

### ***Social, Economic, and Cultural Factors***

Various studies indicate that economic hardship and cultural norms influence CHLB adoption. Families with limited finances may struggle to afford sanitation facilities or purchase essential hygiene items like soap and clean water. Moreover, cultural values that discourage exclusive breastfeeding or emphasize traditional sanitation methods may hinder behavior change. These findings are reflected in the work of Indriati & Warsini (2022), which

highlights the importance of context-specific approaches that account for local social and cultural dynamics to ensure effective CHLB implementation (10).

### CONCLUSION

The implementation of Clean and Healthy Living Behavior (CHLB) plays a vital role in reducing the risk of diarrhea transmission, particularly among young children. This study found that CHLB practices such as handwashing with soap, the use of clean water, and maintaining a healthy diet are effective in lowering the incidence of diarrhea. Furthermore, increased awareness and parental education are crucial to the successful implementation of CHLB.

However, the implementation of CHLB in Indonesia continues to face significant challenges, especially in rural and remote areas. These challenges include limited access to sanitation facilities, a lack of clean water, and socioeconomic constraints. Public education and infrastructure support are essential to the success of CHLB programs. Therefore, collaboration among the government, healthcare workers, and communities is necessary to provide essential infrastructure and to consistently promote hygienic living behaviors. Through sustained and coordinated efforts, CHLB has the potential to improve the quality of life for young children and significantly reduce the incidence of diarrhea in the population.

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